ABSTRACT OF THE DISCLOSURE

[0046] In a preferred embodiment, the invention provides a fiber optic pressure sensor apparatus which includes a light source, a reflective sensor diaphragm movable in accordance with pressure in a medium and an optical fiber coupled to the light source for delivering a first wavefront of light to the reflective sensor diaphragm. The optical fiber has an endface which is separated from the reflective sensor diaphragm by a gap, the endface receiving a second wavefront of light reflected from the reflective sensor diaphragm. The first and second wavefronts constructively and destructively interfere to create a modulated optical signal. A spectrometer is coupled to the optical fiber for converting the optical signal into a series of digital values, and means for analyzing the digital values is provided for obtaining a measurement of the pressure in the medium. An optical coupler is preferably provided for coupling the light source, the optical fiber, and the spectrometer. A power monitoring optical detector means may be coupled to the light source by the optical coupler. A graded-index lens may be coupled to the endface of the optical fiber. The angle between the endface and a longitudinal axis of the optical fiber may be formed to be between zero and 11 degrees. A sealed or vented sensor body may be provided. In sealed embodiments, organic adhesives are preferably used to seal the sensor body. The means for analyzing the digital values preferably includes means for recovering phase information from the modulated optical signal by taking a Fourier transform of the modulated optical signal. Sensor gap measurements are then derived from this phase information.